

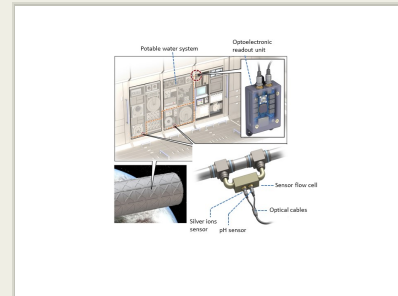
Compact Chemical Monitor for Silver Ions in Spacecraft Water Systems, Phase I

Completed Technology Project (2017 - 2017)



Project Introduction

NASA has identified silver ions as the best candidate biocide for use in the potable water system on next-generation spacecraft. Though significant work has been conducted to develop systems for controlled release silver ions in the water systems, there is no sensor for continuous in-line monitoring of the concentration of silver in the water used by the crew, nor a reliable device to analyze silver in space. Intelligent Optical Systems plans to develop a luminescent indicator-based optical sensor probe to monitor silver concentration directly in spacecraft water systems in real time. The proposed sensor will be based on a technology recently demonstrated by IOS for monitoring wastewater in space systems, in which a specific indicator dye is copolymerized with a stable polymer matrix, resulting in highly sensitive and stable sensor elements. The capability of indicator-doped polymer matrixes to detect silver in the ISS has been demonstrated by NASA and its partners, but further development is required to achieve in-line stand-alone monitoring. Our monitor will incorporate robust sensor elements, interrogated via a compact, low-power optoelectronic unit. The proposed sensor elements will be remotely connected to the electronic circuitry by an electromagnetic interference (EMI)-proof optical fiber cable, allowing flexibility in placing the sensor system, where space is highly valuable. In Phase I we will develop novel sensor elements for silver, and will demonstrate sensitivity, measurements range, and stability. In Phase II, in collaboration with UTC, we will produce prototypes for integration into the ISS Potable Water Systems, and conduct extensive testing under simulated environmental conditions, culminating in delivery to NASA of a monitoring system, bringing the monitor to TRL 7.

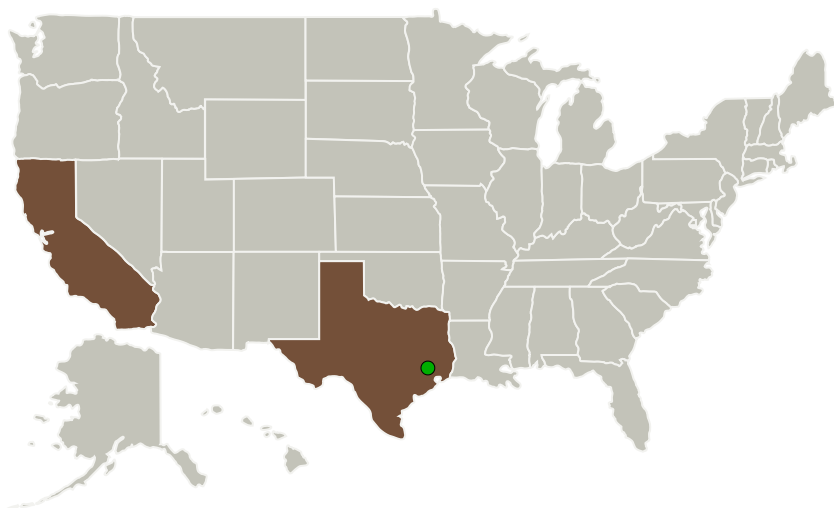


Compact Chemical Monitor for Silver Ions in Spacecraft Water Systems, Phase I Briefing Chart Image

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Primary U.S. Work Locations and Key Partners



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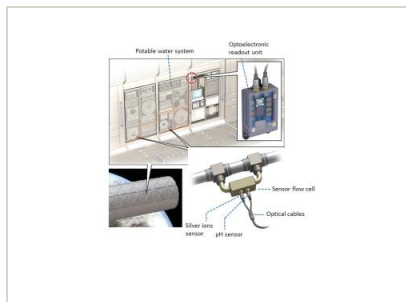


Organizations Performing Work	Role	Type	Location
Intelligent Optical Systems, Inc.	Lead Organization	Industry	Torrance, California
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations

California	Texas
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Images



Briefing Chart Image

Compact Chemical Monitor for Silver Ions in Spacecraft Water Systems, Phase I Briefing Chart Image

(<https://techport.nasa.gov/image/129724>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Optical Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

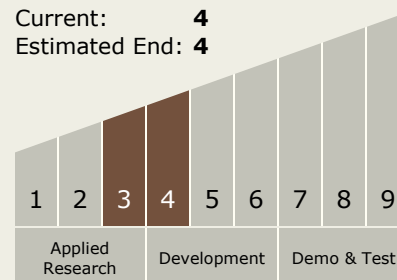
Carlos Torrez

Principal Investigator:

David Berry

Technology Maturity (TRL)

Start: 3
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System